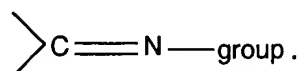


AMENDMENTS TO THE CLAIMS

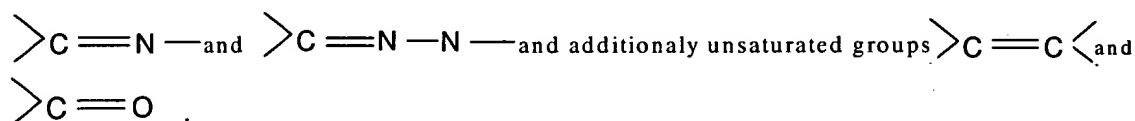
1. (Currently Amended) A process for the hydrogenation of an imine ~~with hydrogen under elevated pressure in the presence of~~ comprising:

- a). forming, with or without an inert solvent, a reaction mixture of 1) an imine, 2) an iridium catalyst and with or without an inert solvent, wherein the reaction mixture contains 3) an acid, and 4) an ammonium chloride, bromide or iodide, or a metal chloride, bromide or iodide that is soluble in the reaction mixture, and additionally contains an acid.
- b). reacting the mixture with hydrogen under elevated pressure.

2. (Original) A process according to claim 2, wherein the imine contains at least one



3. (Original) A process according to claim 1, wherein the imine contains at least one of the groups



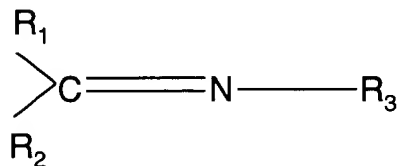
4. (Original) A process according to claim 3, wherein the free bonds are saturated with hydrogen or organic radicals having from 1 to 22 carbon atoms or organic hetero radicals having from 1 to 20 carbon atoms, and at least one hetero atom from the group O, S, N and P; or the

nitrogen atom of the group $>C=N\text{---}$ is saturated with NH_2 or a primary amino group

having from 1 to 22 carbon atoms or a secondary amino group having from 2 to 40 carbon atoms.

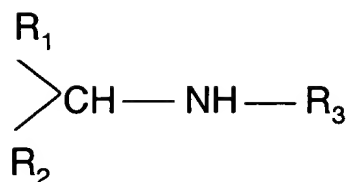
5. (Original) A process according to claim 1, wherein an aldimine, ketimine or hydrazone is hydrogenated.

6. (Original) A process according to claim 5, wherein the imine is an imine of formula I



(I)

which is hydrogenated to form an amine of formula II



(II)

wherein

R₃ is linear or branched C₁-C₁₂alkyl, cycloalkyl having from 3 to 8 ring carbon atoms; heterocycloalkyl bonded *via* a carbon atom and having from 3 to 8 ring atoms and 1 or 2 hetero atoms from the group O, S and NR₆; a C₇-C₁₆aralkyl bonded *via* an alkyl carbon atom, or C₁-C₁₂alkyl substituted by the mentioned cycloalkyl or heterocycloalkyl or heteroaryl;

or wherein

R₃ is C₆-C₁₂aryl, or C₄-C₁₁heteroaryl bonded *via* a ring carbon atom and having 1 or 2 hetero atoms in the ring; R₃ being unsubstituted or substituted by -CN, -NO₂, F, Cl, C₁-C₁₂alkyl, C₁-C₁₂alkoxy, C₁-C₁₂alkylthio, C₁-C₆haloalkyl, -OH, C₆-C₁₂-aryl or -aryloxy or -arylthio, C₇-C₁₆-aralkyl or -aralkoxy or -aralkylthio, secondary amino having from 2 to 24 carbon atoms, -CONR₄R₅ or by -COOR₄, and the aryl radicals and the aryl groups in the aralkyl, aralkoxy and aralkylthio in turn being unsubstituted or substituted by -CN, -NO₂, F, Cl, C₁-C₄-alkyl, -alkoxy or -alkylthio, -OH, -CONR₄R₅ or by -COOR₄;

R₄ and R₅ are each independently of the other hydrogen, C₁-C₁₂alkyl, phenyl or benzyl, or

R₄ and R₅ together are tetra- or penta-methylene or 3-oxapentylene; R₆ has independently the same meaning as given for R₄;

R₁ and R₂ are each independently of the other a hydrogen atom, C₁-C₁₂alkyl or cycloalkyl having from 3 to 8 ring carbon atoms, each of which is unsubstituted or substituted by -OH, C₁-C₁₂alkoxy, phenoxy, benzyloxy, secondary amino having from 2 to 24 carbon atoms, -CONR₄R₅ or by -COOR₄; C₆-C₁₂aryl or C₇-C₁₆aralkyl that is unsubstituted or substituted as R₃, or -CONR₄R₅ or -COOR₄, wherein R₄ and R₅ are as defined hereinbefore; or

R₃ is as defined hereinbefore and R₁ and R₂ together are alkylene having from 2 to 5 carbon atoms that is optionally interrupted by 1 or 2-O-, -S- or NR₆-radicals, and/or unsubstituted or substituted by =O or as R₁ and R₂ above in the meaning of alkyl, and/or condensed with benzene, pyridine, pyrimidine, furan, thiophene or pyrrole; or

R₂ is as defined hereinbefore and R₁ and R₃ together are alkylene having from 2 to 5 carbon atoms that is optionally interrupted by 1 or 2-O-, -S- or NR₆-radicals, and/or unsubstituted or substituted by =O or as R₁ and R₂ above in the meaning of alkyl, and/or condensed with benzene, pyridine, pyrimidine, furan, thiophene or pyrrole.

7. (Original) A process according to claim 5, wherein R₁ and R₂ as heteroaryl form a 5- or 6-membered ring having 1 or 2 identical or different hetero atoms.

8. (Original) A process according to claim 5, wherein R₁ and R₂ as heteroaryl-substituted alkyl are derived from a 5- or 6-membered ring having 1 or 2 identical or different hetero atoms.

9. (Original) A process according to claim 5, wherein R₁ and R₂ as heterocycloalkyl or as hetero-cycloalkyl-substituted alkyl contain from 4 to 6 ring atoms and 1 or 2 identical or different hetero atoms from the group O, S and NR₆, wherein R₆ is hydrogen, C₁-C₁₂alkyl, phenyl or benzyl.

10. (Original) A process according to claim 5, wherein R₁, R₂ and R₃ as alkyl are unsubstituted or substituted C₁-C₆alkyl.

11. (Original) A process according to claim 5, wherein R₁, R₂ and R₃ as unsubstituted or substituted cycloalkyl contain from 3 to 6 ring carbon atoms.

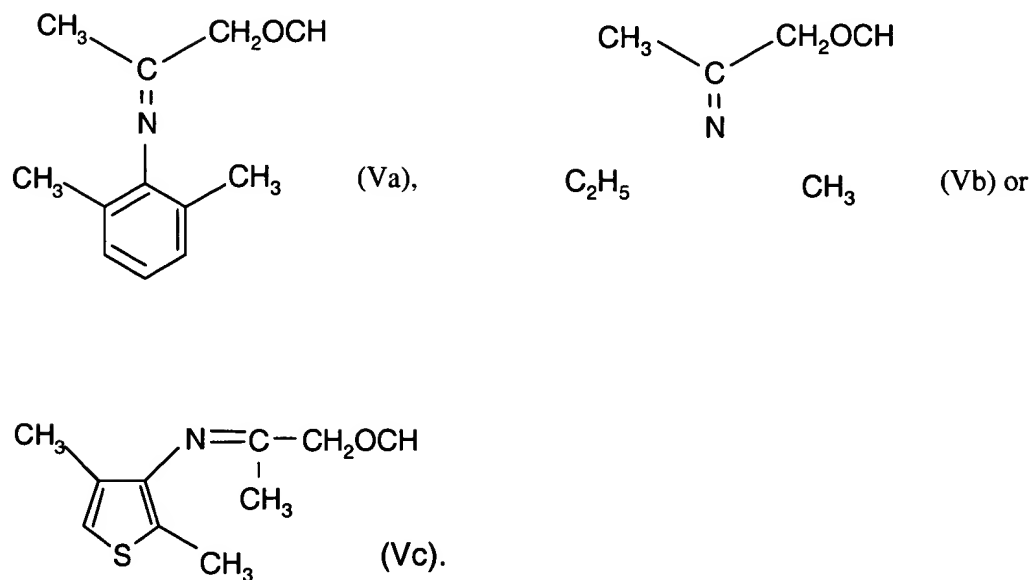
12. (Original) A process according to claim 5, wherein R₁, R₂ and R₃ as aryl are unsubstituted or substituted naphthyl or phenyl, and R₁, R₂ and R₃ as aralkyl are unsubstituted or substituted phenylalkyl having from 1 to 10 carbon atoms in the alkylene.

13. (Original) A process according to claim 5, wherein R₁ and R₂ together or R₁ and R₃ together form, with the carbon atom or the -N=C group to which they are bonded, respectively, a 5- or 6-membered ring.

14. (Original) A process according to claim 5, wherein formula I R₃ is 2,6-di-C₁-C₄alkylphen-1-yl, R₁ is C₁-C₄alkyl, and R₂ is C₁-C₄alkyl, C₁-C₄alkoxymethyl or C₁-C₄alkoxyethyl.

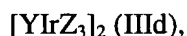
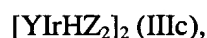
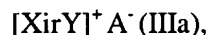
15. (Original) A process according to claim 14, wherein R₃ is 2,6-dimethylphen-1-yl or 2-methyl-6-ethylphen-1-yl, R₁ is ethyl or methyl, and R₂ is methoxymethyl.

16. (Original) A process according to claim 6, wherein the imine corresponds to the formula



17. (Original) A process according to claim 1, wherein the iridium catalyst is a homogeneous catalyst that is substantially soluble in the reaction medium.

18. (Original) A process according to claim 1, wherein the catalyst corresponds to the formula III, IIIa, IIIb, IIIc or IIId



wherein X is two olefin ligands or a diene ligand, Y is a diphosphine having secondary phosphine groups

(a) the phosphine groups of which are bonded to a carbon chain having from 2 to 4 carbon atoms, or

(b) the phosphine groups of which are either bonded directly or *via* a bridge group

-CR_aR_b- in the ortho positions of a cyclopentadienyl ring or are each bonded to a cyclopentadienyl ring of a ferrocenyl, or

(c) one phosphine group of which is bonded to a carbon chain having 2 or 3 carbon atoms and the other phosphine group of which is bonded to an oxygen atom or a nitrogen atom bonded terminally to that carbon chain, or

(d) the phosphine groups of which are bonded to the two oxygen atoms or nitrogen atoms bonded terminally to a C₂-carbon chain;

with the result that in the cases of (a), (b), (c) and (d) a 5-, 6- or 7-membered ring is formed together

with the Ir atom, the radicals Z are each independently of the other(s) Cl, Br or I, A⁻ is the anion of an oxy or complex acid, and M⁺ is an alkali metal cation or quaternary ammonium, and R_a and R_b are each independently of the other hydrogen,

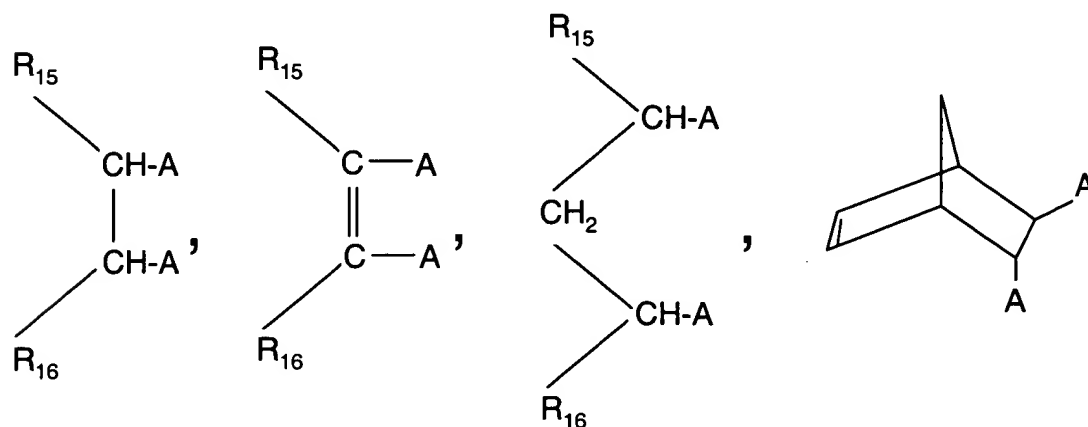
C₁-C₈alkyl, C₁-C₄fluoroalkyl, phenyl or benzyl or are phenyl or benzyl having from 1 to 3 C₁-C₄alkyl or C₁-C₄alkoxy substituents.

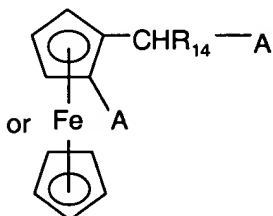
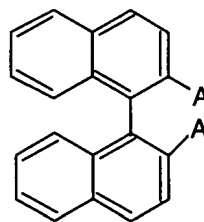
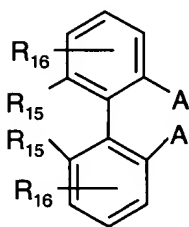
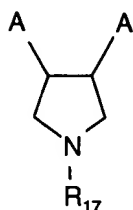
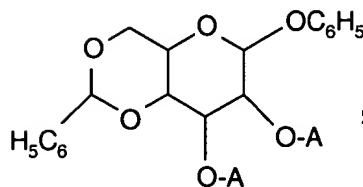
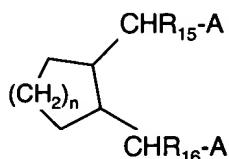
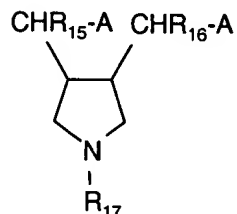
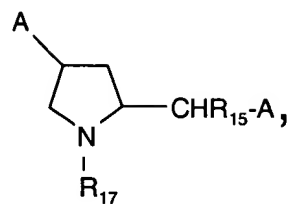
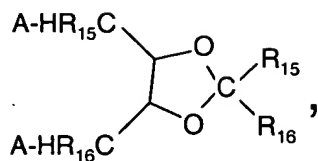
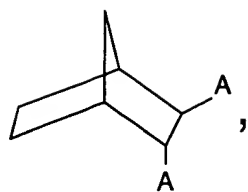
19. (Original) A process according to claim 18, wherein the diphosphine Y contains at least one chiral carbon atom.

20. (Original) A process according to claim 18, wherein X as an olefin ligand is branched or linear C₂-C₁₂alkylene; and X as a diene ligand is an open-chain or cyclic diene having from 4 to 12 carbon atoms.

21. (Original) A process according to claim 18, wherein the secondary phosphine groups contain two identical or different radicals from the following group: linear or branched C₁-C₁₂alkyl; unsubstituted or C₁-C₆alkyl-orC₁-C₆alkoxy-substituted C₅-C₁₂cycloalkyl, C₅-C₁₂cycloalkyl-CH₂-, phenyl or benzyl; or phenyl or benzyl substituted by halogen (e.g. F, Cl or Br), C₁-C₆haloalkyl, (C₁-C₁₂alkyl)₃Si, (C₆H₅)₃Si, C₁-C₆haloalkoxy (e.g. trifluoromethoxy), -NH₂, phenyl₂N-, benzyl₂N-, morpholinyl, piperidinyl, pyrrolidinyl, (C₁-C₁₂alkyl)₂N-, -ammonium-X₁⁻, -SO₃M₁, -CO₂M₁, -PO₃M₁ or by -COO-C₁-C₆alkyl (e.g. -COOCH₃), wherein M₁ is an alkali metal or hydrogen and X₁⁻ is the anion of a monobasic acid.

22. (Original) A process according to claim 18, wherein the diphosphine Y is of the formula:





wherein

R_{15} and R_{16} are each independently of the other hydrogen, C_1 - C_4 alkyl, phenyl, benzyl, or phenyl or benzyl having from 1 to 3 C_1 - C_4 alkyl or C_1 - C_4 alkoxy substituents,

R_{14} is hydrogen, C_1 - C_4 alkyl, phenyl, benzyl, or phenyl or benzyl having from 1 to 3 C_1 - C_4 alkyl or C_1 - C_4 alkoxy substituents,

R_{17} is hydrogen, C_1 - C_4 alkyl, phenyl, benzyl, C_1 - C_6 alkoxy-CO-, C_1 - C_6 alkyl-CO-, Phenyl-CO-, naphthyl-CO- or C_1 - C_4 alkylNH-CO-,

A may be identical or different groups $-PR_2$, wherein R is C_1 - C_6 alkyl, cyclohexyl, phenyl, benzyl, or phenyl or benzyl having from 1 to 3 C_1 - C_4 alkyl, C_1 - C_4 alkoxy, $-CF_3$ or partially or fully fluorinated C_2 - C_4 alkoxy substituents, and

N is 0, 1 or 2.

23. (Original) A process according to claim 18, wherein the diphosphine Y is
 {(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-dimethyl-phenyl)phosphine
 {(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-dimethyl-4-N,N-dipropyl-aminophenyl)phosphine
 {(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-diisopropyl-4-N,N-dimethyl-aminophenyl)phosphine
 {(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-diisopropyl-4-N,N-dibenzyl-aminophenyl)phosphine
 [{(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-dimethyl-4-N,N-dibenzyl-aminophenyl)phosphine
 {(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-dimethyl-4-(1'-pyrrolo)-phenyl)phosphine
 [{(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-dimethyl-4,N,N-dipentyl-aminophenyl)phosphine
 [{(R)-1-[(S)-2-diphenylphosphino]ferrocenyl}ethyl-di(3,5-dimethyl-4,N,N-dimethyl-aminophenyl)phosphine
 1,4-bis(diphenylphosphino)butane or
 [{(R)-1-[(S)-2-di(4-methoxyphenyl)phosphino]ferrocenyl}ethyl-di(3,5-dimethyl-4-N,N-dimethylaminophenyl)phosphine.

24. (Original) A process according to claim 1, wherein the ammonium chloride, bromide or iodide, or the metal chloride, bromide or iodide that is soluble in the reaction mixture, is used in an amount of from 0.01 to 200 mol %, based on the iridium catalyst.

25. (Original) A process according to claim 1, wherein the metal chloride, bromide or iodide used is an alkali metal chloride, bromide or iodide.

26. (Original) A process according to claim 1, wherein the ammonium or alkali metal chloride, bromide or iodide is a tetraalkylammonium chloride, bromide or iodide having from 1 to 6 carbon atoms in the alkyl groups or in the case of an alkali metal chloride, bromide or iodide is a sodium, lithium or potassium chloride, bromide or iodide.

27. (Original) A process according to claim 1, wherein the acid is an inorganic or organic acid.

28. (Original) A process according to claim 1, wherein the acid is used in an amount of from 0.001 to 50% by weight, preferably 0.1 to 50% by weight, based on the imine.

29. (Original) A process according to claim 27, wherein the organic acid is an aliphatic or aromatic carboxylic acid, sulfonic acid or phosphorus (V) acid.

30. (Original) A process according to claim 27, wherein the organic acid is acetic acid, propionic acid, trifluoroacetic acid, chloroacetic acid or methanesulfonic acid, and the inorganic acid is H₂SO₄.

31. (Original) A process according to claim 1, wherein the molar ratio of the imine to the iridium catalyst is from 500 000 to 20.

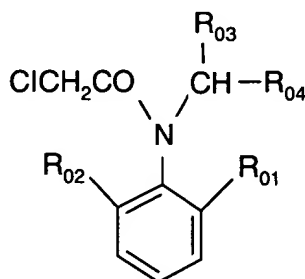
32. (Original) A process according to claim 1, wherein the reaction temperature is from -20 to 100°C.

33. (Original) A process according to claim 1, wherein the hydrogen pressure is from 5 to 150 bar.

34. (Original) A process according to claim 2, wherein the hydrogenation is carried out in a loop reactor.

35. (Original) A process according to claim 1, wherein an aldimine or a ketimine formed *in situ* before or during the hydrogenation is hydrogenated.

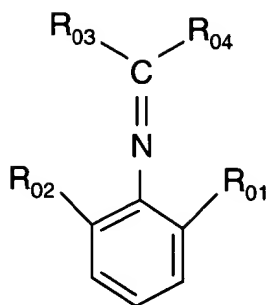
36. (Currently Amended) A process for the preparation of a compound of the formula



(IV),

wherein R₀₁, R₀₂ and R₀₃ are each independently of the other C₁-C₄alkyl, and R₀₄ is C₁-C₄alkyl or C₁-C₄alkoxymethyl or C₁-C₄alkoxyethyl, ~~by (1) hydrogenation of~~ comprising:

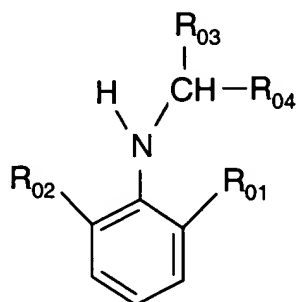
a). forming, with or without an inert solvent, a reaction mixture of 1) an imine of the formula



(V)

~~with hydrogen in the presence of 2) an iridium catalyst, 3) an acid, and 4) an ammonium chloride, bromide or iodide, or a metal chloride, bromide or iodide that is soluble in the reaction mixture;~~

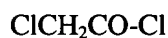
b). reacting the mixture with hydrogen under elevated pressure and with or without an inert solvent to form an amine of the formula



(VI);

and

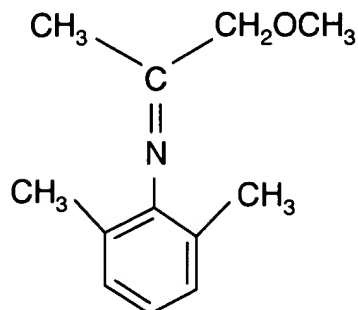
~~(2)~~ c). reaction thereof with the compound of formula



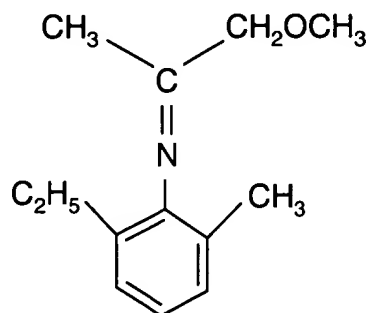
(VII),

~~wherein in the hydrogenation the reaction mixture contains an ammonium chloride, bromide or iodide, or a metal chloride, bromide or iodide that is soluble in the reaction mixture, and additionally contains an acid.~~

37. (Original) A process according to claim 36, wherein the imine used is a compound of the formula



(Va) or



(Vb).